Chemicals in Paper and Board Food Contact Material: Towards More Knowledge, Analytical and Prioritization Analysis

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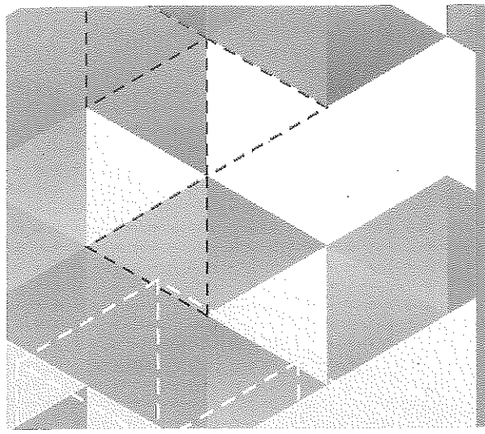

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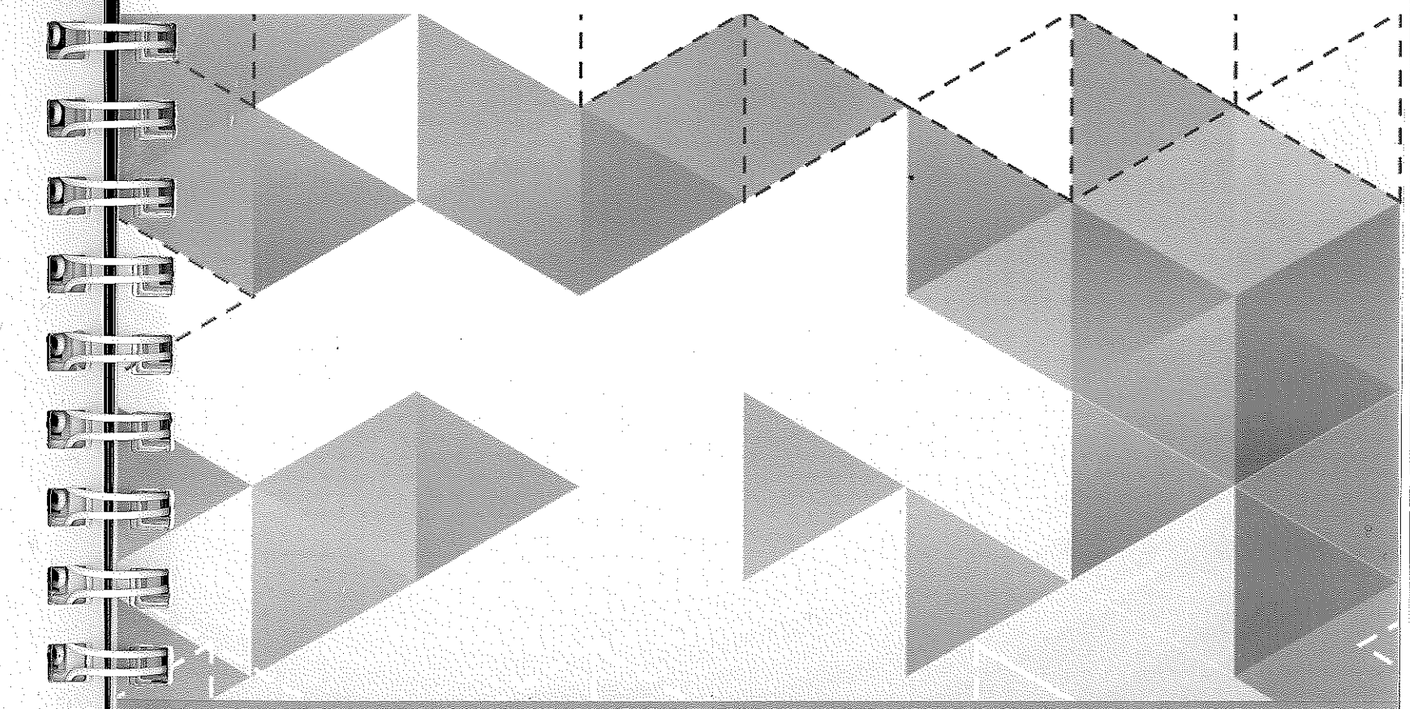

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Chemicals in Paper and Board Food Contact Material: Towards More Knowledge, Analytical and Prioritization Analysis

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This preliminary risk assessment aims to provide a framework for reducing hazards from packaging materials composition. Non-plastic food contact materials, including packaging, may pose human health- and environmental risks because of unknown hazards present in the material migrating to food. The origin of these hazards is mainly related to the lack of knowledge of the products used. Paper and board and recycled paper and board are complex products with a wide array of origins, uses, and production methods. Almost every processing step adds chemicals: either intentionally, such as strengthening agents or surface modifiers, or unintentionally, from the equipment or chemical degradation. The lack of enough knowledge, regulations, and a harmonised whitelist of safe chemicals causes great diversity of unaccountable chemicals in paper samples, and the focus of food safety should lie on prevention and not remedy. The approach presented uses a combination of identification and preliminary risk assessment methods to prioritise emerging contaminants or high-risk chemicals in food packaging papers and boards. The purpose of this work is to provide a framework which manufacturers and legislators can use to assure safe paper products. Firstly, identification is achieved by analysing extracts of paper and board via high resolution mass spectrometry (HRMS). Data is screened against in-house libraries containing over 4000 known chemicals in paper and board materials, and also against libraries of known or predicted CMR compounds (Carcinogenic, Mutagenic or Toxic for Reproduction). Then, semi-quantitative concentrations are estimated and corrected for estimated migration potential. A safe start-point is created by simulating a worst-case scenario where the migrated concentration is overestimated. Thereafter, the chemical identity combined with estimated concentration is evaluated through preliminary hazard assessment to reduce the number of substances that need further evaluation. In parallel to the experimental analysis, a modelling analysis using combined *in silico* models to assess CMR properties are assessed (Vega, http://www.vega-qsar.eu/). The output of the process is an index of chemicals that functions as preliminary prioritisation tool for risk assessment to support decision making for risk assessment studies for both manufacturers and legislators.